Amendments to the Specification

Please replace paragraph [0099] with the following amended paragraph:

Figure 6A. Synthesis of single-stranded DNA with a peptide or carbohydrate 3'-phosphate protecting group. After an addition to the nascent DNA strand (SEQ ID NO.: 1) by a capped nucleotide or oligonucleotide, a protease cleaves the bond between the capping group and the most recently added nucleotide, forming an oligonucleotide (SEQ ID NO.: 2) comprising one more nucleotide base than the nascent DNA strand. The monomer addition can be done with traditional chemical synthesis or enzymatically (by using a terminal transferase or nucleotide ligase). DNA polymerase or nucleotide ligase can be used to add a 3' capped nucleotide or oligonucleotide to the 3' end of the nascent strand. DNA ligase can also be used to add a 5' capped nucleotide or oligonucleotide to the 5' end of the nascent strand. A sample method comprises the use of a tyrosine residue bound to the 3' hydroxyl of the newly added monomer as a capping group. Tyrosyl-DNA phosphodiesterase is used to eliminate the capping group and continue addition of new monomers. Aminoacyl hydrolase, Proteinase K or an evolved enzyme can be used to eliminate other peptide capping groups.

Please replace paragraph [0100] with the following amended paragraph:

Figure 6B. Synthesis of single-stranded DNA with diphosphate or phosphate derivative as a 3'-phosphate protecting group. After an addition to the nascent DNA strand (SEQ ID NO.: 3) by a capped nucleotide or oligonucleotide, forming an oligonucleotide (SEQ ID NO.: 4) comprising one more nucleotide base than the nascent DNA strand, a phosphatase cleaves the bond between the capping group and the most recently added nucleotide. The monomer addition can be done with traditional chemical synthesis or enzymatically (by using a terminal transferase or nucleotide ligase). DNA polymerase or nucleotide ligase can be used to add a 3' capped nucleotide or oligonucleotide to the 3' end of the nascent strand. DNA ligase can also be used to add a 5' capped nucleotide or oligonucleotide to the 5' end of the nascent strand. The capping group is a single phosphate at the 3' or 5' end of the monomer (depending on the chemistry), a 2'3' cyclic phosphate, or multiple beaded phosphate groups, or other phosphate derivatives. A

deoxynucleotide 3' phosphatase, cleaves phosphates from the 3' end of the nascent strand after a nucleotide or oligonucleotide addition has occurred, leaving a free 3' hydroxyl. In the cyclic phosphate case, 2'3' cyclic nucleotide 2' phosphodiesterase and deoxynucleotide 3' phosphatase together cleave the cyclic phosphate and free a 3' hydroxyl.

Please replace paragraph [0101] with the following amended paragraph:

Figure 7. Synthesis of a double-stranded DNA with an oligonucleotide capping group. The capping group is comprised of a nucleotide or short oligonucleotide that can be cleaved by a restriction enzyme from the nascent double stranded DNA (SEQ ID NO.: 1; SEQ ID NO.:5) ~~by a restriction enzyme~~. The oligonucleotide cap may or may not form a DNA secondary structure such as a hairpin loop. After the addition of a capped nucleotide or oligonucleotide, which forms a double stranded oligonucleotide (SEQ ID NO.: 6, SEQ ID NO.: 7) comprising additional nucleotide bases as compared to the nascent double-stranded DNA, a restriction enzyme which recognizes the capping nucleotide sequence will cleave the fragment 3' to the newly added nucleotide, resulting in a double stranded oligonucleotide (SEQ ID NO.: 2, SEQ ID NO.: 8) comprising an additional nucleotide base pair as compared to the nascent double-stranded DNA. A dsDNA oligonucletide with the desired nucleotide or oligonucleotide to be added would also contain a restriction site 3' to the leading strand, whose 3' end of the leading strand would possess a 2'3' dideoxy nucleotide (or other capping group such that prevents multiple monomer addition) and the lagging strand a 5' deoxy ribose (or other capping group that prevents multiple monomer addition). For this particular scheme a Type III or other restriction endonuclease would be used to cut outside of the recognition site, thus leaving only the nascent strand with the newly added nucleotide or oligonucleotide. Thereby, the sequence of the monomer is X-R where X is a specific nucleotide or oligonucleotide sequence that will be added to the nascent strand by nucleotide ligase and R is the restriction enzyme recognition site which will be cleaved after ligation of the new monomer. The desired nucleotide (X) will remain on the nascent strand. This procedure is repeated to create a specific oligonucleotide sequence. Different restriction enzymes and corresponding capping nucleotides or sequence redesign may be required for the creation of desired oligonucleotides in order to prevent sequence recognition

in the nascent strand. DNA ligase or topoisomerase may be covalently bound to the end or beginning of the monomer to facilitate monomer addition.

Please replace paragraph [0103] with the following amended paragraph:

Figure 8A. In this scheme for double-stranded DNA synthesis, the monomer unit that is added to the growing nascent strand is a complex comprised of DNA hairpin-loop (SEQ ID NO.: 9) and an annealed short oligonucleotide insert segment. Additional monomers are first produced by annealing a hairpin-loop and a partially complementary short oligonucleotide insert segment. At one end, the insert segment sequence has at least one base which is complementary to the last base added to the nascent strand, and at the other end of the insert sequence there is at least 1 base which is complementary to its respective hairpin capping group. Both the 5' and 3' ends of the hairpin structure lack reactive hydroxyl groups so are unable to ligate to the insert strand or nascent strand. After hairpins and inserts are annealed, they are purified such that only single hairpin-insert monomers (SEQ ID NO.: 10) are present. The hairpin-insert monomers are added to the nascent double strand (SEQ ID NO.: 11, SEQ ID NO.: 12) and DNA ligase is used to ligate the insert segment to the nascent strand, forming a double-stranded oligonucleotide with a hairpin (SEQ ID NO.: 13) that comprises additional bases as compared to the nascent double-stranded DNA. The capping group is removed by varying the pH or temperature of the solution and further monomers added to create a specific double stranded oligonucleotide sequence (SEQ ID NO: 14, SEQ ID NO.: 12).

Please insert the Sequence Listing filed concurrently herewith following the abstract and renumber the pages of the Sequence Listing starting with page 58.